

## **SERVING TRAY**

### **FIELD OF THE INVENTION**

[0001] The present invention relates to improvements in the field of biomechanics. More particularly, the invention relates to a serving tray and to methods for a user to stabilize a serving tray when carrying, loading or unloading items on the tray.

### **BACKGROUND OF THE INVENTION**

[0002] Traditionally, servers tend to carry heavy loads of items such as plates and/or glasses or the like in their hands or by using a conventional serving tray generally held by a single hand. Such activities cause an important solicitation of the muscles which permit flexion of the wrist and fingers, and the muscles responsible for the radial deviation of the wrist. Moreover, important stresses are exerted on the articulations of the wrist, elbow and shoulder of the arm carrying the load. These stresses are also considerably accentuated since the load of items is substantially far from the body of the user.

[0003] The use of a conventional tray also necessitates a certain deal of experience for a person prior to be able of balancing or stabilizing the tray and use it adequately thereby avoiding accidental spillages. Other important stresses are exerted on the wrist and forearm by the constant supination and pronation efforts expended by the user to stabilize the tray in order to maintain the equilibrium of the load on the top surface of the tray. Such efforts are expended when loading, unloading or carrying the tray.

[0004] Over extended periods of time, these types of stresses can cause serious injuries to the servers or users and more particularly musculoskeletal injuries.

[0005] Several alternatives to the conventional tray have been proposed in the prior art in order to avoid the above drawbacks. For instance, U.S. Pat.

No. 3,504,832 describes a serving tray having a concave semi-cylindrical channel integrally formed therein and adapted to receive the user's forearm. This channel also includes a handle formed in a midsection of the channel. A portion of the channel thus rests on the user's forearm. The hand of the user, when grasping the handle, is in a supinated position. Considerable supination and pronation efforts are needed to maintain the load equilibrium of this tray.

[0006] U.S. Pat. No. 3,941,286 also describes a tray comprising a support having a semi-circular shape and adapted to rest on the user's forearm and/or wrist. This tray further has an opening for inserting the hand so that fingers and a portion of the supinated palm contact the bottom face of the tray and serve as support. The stresses exerted on the user's elbow and shoulder articulations by the weight of the load are even greater than with the conventional tray since the load is disposed farther of the user's body because of the opening which is disposed at one end of the tray.

[0007] U.S. Pat. No. 5,076,438 describes a tray having an underside molded to the contour of the user's supinated hand. This document does not propose solutions to efficiently stabilize the tray, thereby eliminating the supination and pronation efforts expended to balance the tray.

[0008] Suggestions have been made in U.S. Pat. Nos. 5,323,910 and 5,769,264 of handles which can be grasped by the user's hand in a non-supinated position. These trays are supported by the user's hand and forearm since a portion of the tray rests on the forearm. However, by utilizing such trays a user still has to make considerable supination or pronation efforts to maintain load equilibrium on the top surface, especially since beverage container supports are disposed in an asymmetrical manner which complicates the task of stabilizing the tray. These trays permit the user to stand and move in social gatherings while eating and drinking, but are not designed to carry heavy loads of items comprising several plates and/or glasses.

[0009] Servers usually tend to hold the tray with one hand and unload the tray and serve the clients with the other hand. Such a technique sometimes lead to accidental spillages since the server must continually maintain the equilibrium of the load of items on the tray while distributing items to clients. Thus, by stretching the serving arm and bending over a table to serve clients, the server cannot easily maintain equilibrium of the load of items on the tray which may cause spillages. This technique is also tiring for the holding arm. In order to eliminate such tedious tasks, the servers sometimes use a conventional tray stand which is disposed adjacent to clients' table and the tray is placed on the stand so as to permit the server to use both hands to unload the tray and serve clients. Such tray stands are generally foldable and are adapted to be disposed on the ground. However, such a technique is often performed in several steps. A first step required to take the tray stand from a particular place in the restaurant or the bar and to bring it to a position adjacent to the table, and a second step wherein the tray is brought to the stand and deposited on it. In a third step, the server must put back the tray stand at this particular place. Moreover, these tray stands are substantially cumbersome and may block the passage in an aisle of a restaurant or a bar. These tray stands can also be accidentally hit and tipped over by a client or a server.

#### **SUMMARY OF THE INVENTION**

[0010] It is therefore an object of the present invention to provide a serving tray and method which overcome the above drawbacks.

[0011] According to one aspect of the invention, there is provided a serving tray comprising a planar member having a peripheral edge, a top surface dimensioned to receive a load of items and a bottom surface having a bearing portion adjacent to the edge, wherein the bearing portion is dimensioned to rest on a user's forearm and the peripheral edge has a portion

with a form permitting the load to be positioned in close proximity to the user's body.

[0012] Applicant has found quite surprisingly that by using a tray as defined above, it is possible to diminish the stress exerted by the weight of the load on the user's elbow and/or shoulder articulations.

[0013] According to another aspect of the invention, there is provided a serving tray comprising a planar member having a peripheral edge, a top surface dimensioned to receive a load of items and a bottom surface having a bearing portion adjacent to the edge, wherein the bearing portion is dimensioned to rest on a user's forearm and the peripheral edge has a portion with a form permitting the planar member to contact the user's body.

[0014] Applicant has found quite surprisingly that by using the latter tray, it is possible to stabilize the planar member and reduce supination and pronation efforts of the user to maintain the load in equilibrium on the top surface.

[0015] According to still another aspect of the invention, there is provided a serving tray system comprising:

- a serving tray including a planar member having a top surface dimensioned to receive a load of items and a bottom surface having a bearing portion dimensioned to rest on a user's forearm; and

- a stabilizing member dimensioned to be secured to the user's body at a position lower than user's elbows and to contact the bottom surface so as to support the planar member, thereby stabilizing the planar member.

[0016] Applicant has found quite surprisingly that by using a tray system as defined above, it is possible to reduce supination and pronation efforts of the user to maintain the load in equilibrium on the top surface.

[0017] According to yet another aspect of the invention, there is provided a method for a user to stabilize a serving tray when carrying, loading, or unloading items on the tray, the user having a body, a hand and a forearm, the method comprising the steps of:

a) providing a serving tray comprising a planar member including a peripheral edge having a portion with a form permitting the planar member to contact the body, a bottom surface and a top surface dimensioned to receive a load of the items;

b) supporting the planar member by holding a predetermined portion of the bottom surface with the hand and resting another predetermined portion of the bottom surface on the forearm; and

c) contacting the peripheral edge portion with the body.

[0018] Applicant has found quite surprisingly that by using a method as defined above, it is possible to stabilize the planar member at three points of support and reduce supination and pronation efforts to maintain the load in equilibrium on the top surface.

[0019] According to a further aspect of the invention, there is provided a method for a user to stabilize a serving tray when carrying, loading, or unloading items on the tray, the user having a body, an elbow, a hand and a forearm. Such a method comprises the steps of:

a) providing a serving tray comprising a planar member including a bottom surface and a top surface dimensioned to receive a load of the items;

b) supporting the planar member by holding a first predetermined portion of the bottom surface with the hand and resting a second predetermined portion of the bottom surface on the forearm;

c) providing a stabilizing member and securing the stabilizing member to the body at a position lower than the elbow; and

d) contacting a third predetermined portion of the bottom surface with the stabilizing member.

[0020] Applicant has found quite surprisingly that by using the latter method, it is possible to stabilize the planar member at three points of support and reduce supination and pronation efforts to maintain the load in equilibrium on the top surface.

[0021] The planar member can further include a peripheral edge having a portion with a form permitting the planar member to contact the body, preferably the torso. The peripheral edge portion is preferably formed with a recess. The peripheral edge portion can also permits the load to be positioned in close proximity to the user's body.

[0022] According to still a further aspect of the invention, there is provided a method for a user to carry items on a serving tray and unload the items therefrom, the user having a body, a hand and a forearm. Such a method comprises the steps of:

a) providing a serving tray comprising a planar member including a top surface having a load of the items thereon, a bottom surface and a supporting member connected to a first predetermined portion of the bottom surface, the supporting member being dimensioned for being grasped by the hand in a neutral position;

b) supporting the planar member by grasping the supporting member with the hand and resting a second predetermined portion of the bottom surface the a forearm;

c) carrying the tray from a first location to a second location whereat is disposed a table having a base member comprising an aperture dimensioned to receive the supporting member;

d) placing the supporting member into the aperture to thereby hold the tray; and

e) unload the top surface.

[0023] Applicant has found quite surprisingly that by using the latter method, it is possible to serve clients and unload the top surface without efforts of maintaining load equilibrium on the top surface and by optionally using both hands.

[0024] The expression "neutral position" as used herein refers to a position whereat the hand is not significantly supinated or pronated.

[0025] The term "table" as used herein is not limited to a diner table but also includes a coffee table, a side table, a bar, a credence, a dumbserver, a kitchen counter, a kitchen island, a service-hatch or the like.

[0026] The serving tray of the invention preferably further includes a supporting member connected to the bottom surface and dimensioned for being grasped by a hand of the user in a neutral position. The load is preferably positioned in close proximity with the user's torso.

[0027] In the tray of the invention, the planar member can have a substantially triangular configuration. Preferably, the triangular configuration has rounded corners. The planar member can have a front portion comprising one corner, and a rear portion comprising two corners. Preferably, the planar member further includes a peripheral lip. The planar member can comprise a polymeric material or can be constituted of such a polymeric material. Preferably, the polymeric material is selected from the group consisting of polyurethane, polyethylene, polyamide, polyimide, polypropylene, and polycarbonate.

[0028] The top surface of the tray of the invention is preferably a non-slip surface. More particularly, such a non-slip surface can be provided by a coating or a layer of a non-slip material applied to the planar member. The coating or layer of the non-slip material is preferably applied to the whole area of the top surface. Alternatively, a peripheral band of the non-slip material can be applied to the top surface, thereby leaving the central portion

of the top surface without coating or layer of the non-slip material. Preferably, the non-slip material comprises a cork material.

[0029] In the tray of the invention, the supporting member can be a handle extending substantially at right angle from the bottom surface. Preferably, the handle is adjustably connected to the bottom surface so as to be displaced for positioning at a selected position. The position can be selected according to the length of the user's forearm. The neutral position is preferably a position whereat the palm of the user's hand is oriented substantially vertically. Alternatively, the supporting member can be permanently fixed to the bottom surface. The supporting member and the planar member can be moulded in a single piece. The supporting member is preferably connected to the bottom surface in a manner such that at least 60 % of the area of the bottom surface is comprised between the supporting member and the rear portion. More preferably, 60 to 85 % and even more preferably 65 to 75 % of the area of the bottom surface is comprised between the supporting member and the rear portion.

[0030] In the tray of the invention, the bearing portion rests on the user's forearm, preferably between the elbow and the wrist. The bearing portion of the tray of the invention can be provided with a cushion member fixed thereto. Alternatively, the bearing portion can be provided with another supporting member fixed thereto. The other supporting member is preferably a U-shaped cradle.

[0031] The peripheral edge portion of the tray of the invention can be formed with a recess. Preferably, the recess is disposed between the corners of the rear portion. The recess can also be provided with a deformable polymeric material fixed thereto and the polymeric material is contacting the user's body. The polymeric material can be in the form of a band fixed to the recess.

[0032] In the tray of the invention, the items carried on the top surface of the tray can be plates and/or glasses. The plates preferably have a diameter



ranging from about 10 to about 40 cm. A diameter ranging from about 20 to about 30 cm is preferred. Preferably, the glasses are disposed in the central portion of the planar member and the plates are disposed at the periphery of the glasses. More preferably, three plates having a diameter of about 20 to about 30 cm are disposed on the planar member, one on each corner, and up to five and preferably three or less glasses are disposed in the central portion of the planar member. Preferably, the top surface has an area ranging from about 800 to about 4000 cm<sup>2</sup> and more preferably from about 1400 to about 2600 cm<sup>2</sup>. The area is preferably dimensioned according to the standard size of the plates and/or glasses which are carried on the latter.

[0033] The tray of the present invention can be used in combination with a base member dimensioned to be fixed to a table and the tray system of the present invention can further comprise such a base member. The base member can alternatively be formed integrally with the table. The base member can have an aperture dimensioned to receive the supporting member to thereby hold the tray and permit the user to load and unload the top surface without efforts maintaining load equilibrium on the top surface.

[0034] The preferred embodiments described above in respect of the tray according to the invention can also be applied to the tray of the tray system of the invention as well as to the tray used in the various methods of the invention.

[0035] In the tray system of the invention, the stabilizing member can comprise a brace member contacting at one end the bottom surface and connected at another end to a bracket member, the bracket member being dimensioned to be secured to the user's body. The bracket member can have a slot dimensioned to receive a user's waist belt. The brace member is preferably pivotally connected to the bracket member. More preferably, the brace member is provided at the one end with a gripping member dimensioned to contact the bottom surface. The brace member can be a rod.

The gripping member can have a non-slip contact surface. The gripping member is preferably made of a polymeric material. The polymeric material preferably permits absorption of shocks and/or vibrations generated when carrying the tray.

[0036] The planar member of the tray system of the invention can further include a peripheral edge having a portion with a form permitting the load to be positioned in close proximity to the user's body, thereby diminishing stress exerted by the weight of the load on the user's elbow and/or shoulder articulations. The peripheral edge portion is preferably formed with a recess. Alternatively, the planar member can further include a peripheral edge having a portion with a form permitting the planar member to contact the user's body, thereby stabilizing the planar member and reducing supination and pronation efforts of the user to maintain the load in equilibrium on the top surface. Preferably, the peripheral edge portion is formed with a recess disposed between the corners of the rear portion. More preferably, the recess is provided with a deformable polymeric material fixed thereto and the polymeric material is contacting the user's body.

[0037] The preferred embodiments described above in respect of the stabilizing member of the tray system according to the invention can also be applied to the stabilizing member used in the various methods of the invention.

[0038] In the methods of the invention for a user to stabilize a serving tray, the predetermined portion of the bottom surface is preferably provided with a supporting member connected thereto. The supporting member is preferably dimensioned for being grasped by the hand in a neutral position. The supporting member is preferably a handle extending substantially at right angle from the bottom surface.

[0039] The method for a user to carry items on a serving tray and unload the items therefrom can further comprise the steps of:

c') providing a stabilizing member and securing the stabilizing member to the body at a position lower than elbows; and

c'') contacting a third predetermined portion of the bottom surface with the stabilizing member, thereby stabilizing the planar member at three points of support and reducing supination and pronation efforts to maintain the load in equilibrium on the top surface.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

[0040] Further features and advantages of the invention will become more readily apparent from the following description of preferred embodiments as illustrated by way of examples in the appended drawings wherein:

[0041] Fig. 1 is a bottom perspective view of a tray according to a preferred embodiment of the invention, held by a user;

[0042] Fig. 2 is a top plan view of the tray shown in Fig. 1;

[0043] Fig. 3 is a bottom perspective view of a tray system according to another preferred embodiment of the invention;

[0044] Fig. 4 is a right side view of a stabilizing member as shown in Fig. 3;

[0045] Fig. 5 is a perspective view of a base member according to still another preferred embodiment of the invention, fixed to a table;

[0046] Fig. 6 is a perspective view of the base member shown in Fig. 5 wherein the tray shown in Fig. 1 has been inserted;

[0047] Fig. 7 is a bottom perspective view of a tray according to a further preferred embodiment of the invention, held by a user; and

[0048] Fig. 8 is a top plan view of a tray according to still a further preferred embodiment of the invention.

#### **DESCRIPTION OF PREFERRED EMBODIMENTS**

[0049] Referring first to Fig. 1, there is shown a serving tray 10 held by a user 11. The tray 10 comprises a planar member 12 having a top surface 14

(shown in Fig. 2) dimensioned to receive a load of items 15 (shown in Fig. 6), and a bottom surface 16 having a handle 17 fixed thereto. The handle 17 has a lower end 18 dimensioned to be placed in an aperture 19 of a base member 20 (shown in Fig. 5). The handle 17 is also dimensioned to be grasped by the user's hand 21 in a neutral position. The tray 10 has a peripheral edge 22 with a recess 23 dimensioned to receive the user's torso 24, and a peripheral lip 25. The bottom surface 16 also has a cushion 26 fixed thereto and dimensioned to rest on the user's forearm 27.

[0050] As shown in Fig. 2, the planar member 12 has a triangular configuration with rounded corners 28. The planar member 12 has a longitudinal slot 29 dimensioned to receive a screw 30 which is screwed into the handle 17. This permits the handle 17 to be adjustably displaced for positioning at a selected position by loosening the screw 30, moving the handle 17 and retightening the screw 30. Thus, the position of handle 17 can be adjusted according to the size of the user's forearm 27.

[0051] Fig. 3 shows a serving tray system 31 comprising the tray 10 illustrated in Figs. 1 and 2, and a stabilizing member 32 having a bracket member 34. The stabilizing member 32 also has a rod 36 pivotally connected at one end to the bracket member 34 by means of a pin pivot 38. The rod 36 is provided at the other end with a gripping member 40 dimensioned to contact the bottom surface 16 of the tray 10. As shown in Fig. 4, the bracket member 34 has a slot 42 dimensioned to receive the user's belt 44.

[0052] Figs. 5 and 6 show the base member 20 fixed to a table 46. The tray 10 is held by the base member 20, the lower end 18 of the handle 17 being inserted in the aperture 19 formed in the base member 20. The load of items 15 includes plates 48 and glasses 50.

[0053] Fig. 7 shows a tray 10' which is identical to the tray 10 shown in Fig. 1, with the exception that the cushion 26 has been replaced with a U-shaped cradle 26' which acts as a further supporting member.

[0054] Fig. 8 shows a tray 10" which is identical to the tray 10 shown in Fig. 2, with the exception that a band of a deformable polymeric material 52 has been fixed to the recess 23.

[0055] The handle 17 extends substantially at right angle from the bottom surface 16 of the tray 10, thereby extending vertically and permitting the user's hand 21 to be in a neutral position. Since the user 11 grasps the handle 17 with his hand 21 in a neutral position, he is less exposed to wrist fatigue and/or injuries which may be caused over extended periods of time by repeated rotation of the forearm 27 in a supinated or pronated position. The cushion 26 rests on the user's forearm 27 and the recess 23 formed in the peripheral edge 22 contacts the user's torso 24 so as to stabilize the planar member 12 at three points of support, thereby reducing supination and/or pronation efforts to maintain the load of items 15 in equilibrium on the top surface 14. The recess also permits the load of items, preferably the two plates adjacent to the recess 23 (shown in Fig. 6), to be positioned in close proximity to the torso 24.

[0056] Thus, the user 11 can carry, load or unload the tray 10 without constantly making supination and/or pronation efforts to maintain the equilibrium of the load of items 15 on the top surface 14. Moreover, the user 11 does not have to constantly worry about the relative position of the items 15 on the top surface 14 since the planar member 12 thus stabilized has less tendency to tip over even if the load on the top surface 14 is unbalanced. The recess 23 also permits the load of items 15 to be positioned in close proximity to the torso 24, thereby diminishing the stress exerted by the weight of the load of items on the user's supporting arm and more particularly, on the user's elbow and/or shoulder articulations.

[0057] As shown on Figs. 3 and 4, the stabilizing member 32 can be used as an additional support means. The belt 44 of the user 11 is inserted into the slot 42 of the bracket member 34 and the rod 36 is positioned in such a

manner that the gripping member 40 contacts the bottom surface 16 of the planar member 12, so that the latter is stabilized at four points of support. The use of the stabilizing member 32 further increase the stability of the planar member 12 and thus further facilitates the carrying, loading or unloading of the items 15 on the top surface 14 of the tray 10. Since the rod 36 is pivotally connected to the bracket member 34, the rod can be lifted upwardly so as to abut the bracket member 34 and thereby stand in a non-supporting position. Such a position can be advantageously selected by the user when he is not carrying the tray 10.

[0058] As shown on Figs. 5 and 6, the user of the tray 10 can place the lower end 18 of the handle 17 in the aperture 19 of the base member 20 in a manner such that the tray 10 is held by the base member 20. This optional feature is very useful when unloading the load of items 15 and, more particularly, when unloading plates 48 and/or glasses 50 from the top surface 14 so as to serve clients. The user 11 can thus use both hands to unload plates 48 and/or glasses 50 and, when removing the items from the table 46, to reload them on the tray 10. By using the tray 10 and the base member 20, the user can unload or load the tray without worrying about the equilibrium of the load of items 15 on the top surface 14. The base member 20 can be fixed to the table by means of adhesive nails, screws, clamps etc. Alternatively, the base member 20 can be formed integrally with the table 46.

[0059] Although Figs. 1 to 6 show a tray adapted for a user which utilizes his left arm as supporting arm, the same features as described above can be applied to a tray adapted for a user which utilizes his right arm as supporting arm.

[0060] While the invention has been described with particular reference to the illustrated embodiment, it will be understood that numerous modifications thereto will appear to those skilled in the art. Accordingly, the above

description and accompanying drawings should be taken as illustrative of the invention and not in a limiting sense.